MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

PEM0016 – ALGEBRA

(Foundation in Engineering)

26 OCTOBER 2018
9.00 a.m to 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **3** pages including the cover page.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of marks for each question is given.
3. Please write all your answers in the answer booklet provided.

Answer ALL the questions (100 marks).

Question 1 (25 Marks)

(a) Solve for x in the equation: $\sqrt{\sqrt{2x+8}-x}=2$.

(7 marks)

(b) Solve for x in the inequality: $\frac{1}{5-x} \leq -\frac{2}{x-2}$. (8 marks)

(c) Solve the following inequality: $|x+5|-2>|-10|$. (4 marks)

(d) Solve the following equation by using equation quadratic in form.

$$\frac{2}{(x-2)^2}-\frac{2}{(x-2)}=12$$

(6 marks)

Question 2 (25 Marks)

(a) Given functions $f(x)=\sqrt{2x-1}$ and $g(x)=\log_4(4x-1)$, determine the following:

(i) Domain for $f(x)$ and $g(x)$. (2 marks)

(ii) Composite function $f \circ g(x)$ and its domain. (8 marks)

(iii) $g^{-1}(x)$. (6 marks)

(b) Sketch a graph for $f(x)=-2(x-3)^2+4$ by using function transformation techniques. Show all stages of graphing transformation with at least two coordinates on each transformation stage.

(9 marks)

Continued...

Question 3 (25 Marks)

(a) A polynomial function $f(x)=x^4-ax^3-bx^2+52x-60$ is given. Provided that $(x-2)$ and $(x+3)$ are the factors of $f(x)$, determine a and b.

(6 marks)

(b) Find the partial fraction decomposition of $\dfrac{x-4}{(x+4)(x+2)^2}$.

(10 marks)

(c) Given that the coefficient of the term containing x^3 in the binomial expansion $(2x-a)^8$ is -448. Determine a.

(4 marks)

(d) Sketch $g(x)=(x-2)^2(x+3)(x-5)$ and label at least 3 points on the graph.

(5 marks)

Question 4 (25 Marks)

(a) Solve the following equations by using **inverse matrix method.**

$$\begin{cases} 3x+2y-z=1 \\ 3y-7z=-6 \\ 5x-2y+9z=7 \end{cases}$$

(17 marks)

(b) Use Cramer's rule to solve the following linear equations.

$$5x+2y=0$$
$$x-4y=22$$

(5 marks)

(c) Matrix $A=\begin{bmatrix} a & 2 \\ 3 & 6 \end{bmatrix}$ is given.

Determine $3A+2I$, provided matrix A is non-invertible.

(3 marks)

End of Paper